

gave 6,552 particles per cubic centimeter. While this is less than the maximum obtained on April 7, 1925 (1), no doubt had a measurement been taken an hour earlier it would have yielded a much larger number of particles.

Although the actual number of particles obtained in the downtown section is nearly eight times that obtained at the suburban point, this does not tell the entire story. The count at the American University revealed a considerable portion of mineral matter and most of the soot particles were much smaller than the ones obtained later in the day. This is probably accounted for by the

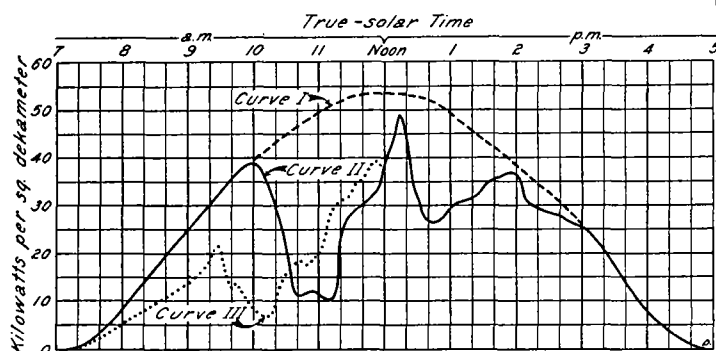


Fig. 1.—Curve I. Total thermal energy per square dekameter of horizontal surface to be expected at the American University with a cloudless sky, January 16, 1926

Curve II. Actual thermal energy per square dekameter of horizontal surface received at the American University, January 16, 1926

Curve III. Actual thermal energy per square dekameter of horizontal surface received at the National Academy of Science Building, Twenty-first and B Streets NW., D. C., during the morning of January 16, 1926

fact that the smoke particles obtained at the university were the laggards, or particles from smoke of previous days so tiny that they had not yet fallen to the ground.

A most objectionable feature of particles in fresh smoke is the fact that they are composed of from 20 to 40 per cent tarry products, when the smoke comes from plants not equipped with an effective smoke consumer—and practically no residences are so equipped. On the other hand, a well designed smoke consumer reduces the tarry composition to about 1 per cent.

The accompanying Figure 1 shows graphically the decrease in the total thermal energy received from the sun and sky on a horizontal surface at both the American University and at the National Academy of Science Building, Twenty-first and B Streets NW., as compared with a smoke-free sky. Comparison of Curves II and III shows clearly the passage of the cloud from the city to the university campus.

The intensity of thermal energy received on a horizontal surface at the American University at 11 a. m. was 11 kilowatts per square dekameter as compared with the 49 kilowatts that would have been received had the sky been free from smoke. Computed on the basis of a square mile, or 25,900 square dekameters, the energy received with a clear sky becomes 1,269,100 kilowatts, and for a smoky sky 284,900 kilowatts. Therefore the loss of energy per square mile was nearly 1,000,000 kilowatts per square mile, or sufficient energy to support 25 million 40-watt lamps.

Lieutenant Smirnoff of the Potomac Electric Power Co. informs me that at 11 a. m. on January 16 in what is known as the down-town section of Washington, covering about $3\frac{1}{2}$ square miles, the electric load was 64,000 kilowatts, as compared with an average for this hour in January on clear days of 52,000 kilowatts.

Besides the loss in thermal solar energy due to the smokiness of the air over cities, perhaps a more serious loss is the almost complete elimination of ultra-violet radiation, which recent investigations have shown to be of great physiological importance.

The Washington smoke cloud of January 16, while unusual for this city, was no denser than that commonly found when light winds prevail in the business centers of large cities where bituminous coal is burned (2).

LITERATURE CITED

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1925. Effect of local smoke on visibility and solar radiation intensities. *Mo. Wea. Rev.*, 53: 147-148.
- (2) Kimball, Herbert H., and Hand, Irving F.
1924. Investigations of the dust content of the atmosphere. *Mo. Wea. Rev.*, 52: 133. See especially "Dust counts away from Washington," pp. 138-139.

551.506 (261.1)

WEATHER OF NORTH AMERICA AND ADJACENT OCEANS

NORTH ATLANTIC OCEAN

By F. A. YOUNG

January is considered the stormiest month of the year over the North Atlantic and during the current month the number of days with winds of gale force not only exceeded the normal, as shown on the Pilot Chart, over the greater part of the ocean, but during the first and last decades the wind attained hurricane force over an unusually large area. The weather during the latter period was especially severe and was responsible for the large number of casualties reported, including the wreck of the *Antinoe*, *Laristan*, and a number of other vessels. Taken as a whole the month will be remembered as one of the most severe on record, and a number of trans-Atlantic vessels reported from 4 to 5 separate storms en route, covering practically the entire voyage.

As is often the case during protracted periods of stormy weather, fog was comparatively rare over the Grand Banks, the steamer lanes, and off the European coast, although unusually prevalent in the Gulf of Mexico, where it was reported on 6 days.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, 8 a. m. (seventy-fifth meridian time). North Atlantic Ocean, January, 1926

Stations	Average pressure ¹	Departure	Highest	Date	Lowest	Date
	Inches		Inches		Inches	
St. Johns, Newfoundland.	29.58	-0.37	30.10	17th	28.62	29th
Nantucket.	29.97	-0.12	30.44	8th	29.38	28th
Hatteras.	30.10	-0.02	30.48	29th	29.64	22d
Key West.	30.09	0.00	30.24	1st	29.92	30th
New Orleans.	30.13	+0.01	30.40	1st	29.76	31st
Swan Island.	29.92	-0.06	30.00	23d	29.84	21st
Turks Island.	30.11	+0.13	30.20	4th	29.94	14th
Bermuda.	30.20	+0.07	30.48	17th	29.70	14th
Horta, Azores.	30.08	-0.02	30.52	16th	29.52	9th
Lerwick, Shetland Islands	29.66	-0.05	30.47	13th	29.19	23d
Valencia, Ireland.	29.68	-0.22	30.23	13th	28.83	31st
London.	29.87	-0.13	30.33	12th	29.34	3d

¹ From normals shown on H. O. Pilot Chart, based on observations taken at Greenwich mean noon, or 7 a. m., seventy-fifth meridian.

² And on other dates.

Unusually low average pressure prevailed at the stations on the American coast north of Nantucket, as well as the coast of northern Europe. The average at Horta was near the normal, although winds of force 7 or higher

were reported on 13 days at that station, the maximum being south, force 9, on the 27th.

Charts VIII to XI show the conditions from the 28th to 31st, inclusive, and while it would be interesting to have presented charts for a number of other days, it was impracticable to do so on account of lack of space.

The month began with one depression over Newfoundland and a second central near 48° N., 30° W. The western Low was of slight intensity, although from the 1st to 3d a few reports of moderate gales were received from vessels between the Bermudas and Nova Scotia. The eastern disturbance, which was off the coast of Scotland on the 3d and 4th was much more active, and on the first three days of the month moderate to strong gales prevailed over the eastern section of the steamer lanes, while on the 4th heavy weather was encountered over the greater part of the ocean west of the twentieth meridian, as well as off the coast of southern Europe.

On the 5th and 6th there was a well-defined storm area between the fortieth and fifty-fifth parallels, west of the forty-fifth meridian, where at times the wind attained hurricane force. On the 6th there was also a Low near Father Point, and while at the time of observation, moderate weather prevailed along the American coast, westerly gales occurred later in the day off Hatteras.

On the 7th there was a slight depression in the Gulf of Mexico, and northerly winds of gale force were encountered in the western section. On the same day there were also Lows central near St. Johns, Newfoundland, and Stornoway, Scotland, respectively, with gales over the greater part of the steamer lanes, as well as in the vicinity of the British Isles. On the 8th the Gulf depression was central near Charleston, and on the 9th off the coast of New Jersey. On the former date moderate gales were reported off Hatteras, while by the 9th the storm area extended along the coast between Charleston and Nantucket. On the 8th the Low that was near St. Johns on the 7th, was central near 53° N., 38° W., while the European disturbance had moved but little. On that date strong westerly gales prevailed west of the thirty-fifth meridian and southerly winds of gale force were also encountered between the twenty-fifth meridian and the British coast.

On the 9th the greater part of the ocean east of the fifty-fifth meridian, between the thirty-fifth and fifty-fifth parallels, was swept by strong gales, which at times attained hurricane force. On the 10th the Atlantic coast disturbance of the previous day was about 5° east of St. Johns, and the eastern Low near 50° N., 27° W., the weather conditions being similar to that of the 9th except that the two storm areas had merged and now extended as far west as the sixtieth meridian. The eastern Low moved but little during the next 48 hours, but by the 11th the storm area had contracted considerably in extent and moderate weather was the rule west of the fortieth meridian, except for moderate northwesterly gales off the east coast of Florida, while the eastern section of the steamer lanes was storm swept as far south as the Azores. This disturbance continued to decrease in intensity and extent and by the 12th and 13th only scattered gale reports were received by vessels in the eastern part of the ocean.

On the 14th there was a small, but well-developed, depression between the Bermudas and Hatteras that moved northeastward along the coast, and on the 15th was central near Sable Island, while on both days gales

prevailed near the respective centers. On the 14th and 15th gales were also reported by vessels in widely scattered locations in the middle and eastern sections of the steamer lanes.

By the 16th the western disturbance had moved off the limits of the chart, while the weather over the greater part of the ocean was about the same as on the 15th, except that a Low developed near 50° N., 20° W., that moved steadily eastward, and on the 17th was off the coast of France where strong westerly gales prevailed.

The 18th was apparently the quietest day of the month, as only two reports have been received of gales on that date.

On the 19th there was a Low over Nova Scotia and Maine with southerly gales as far south as the Bermudas, while moderate weather prevailed over the remainder of the ocean, except for a disturbance of limited extent near 50° N., 25° W.

On the 20th the western Low was central about 10 degrees east of St. Johns with the eastern one about the same distance west of the west coast of Ireland, and vessels near the centers of both depressions reported moderate gales. By the 21st the western Low of the 20th was central near 50° N., 30° W., and the eastern over Ireland, with gales prevailing over a limited area in the vicinity of the former.

On the 21st there was a depression in the western part of the Gulf of Mexico, where on that date and also on the 22d, moderate gales occurred. This Low moved northeastward with extreme rapidity, and on the 22d was central near the south coast of Newfoundland; gales prevailed along the coast between Georgia and Nova Scotia, extending as far east as the Bermudas, while conditions in mid-ocean had changed but little since the 21st.

On the 23d the western disturbance was central about 10° east of St. Johns; it had increased tremendously in intensity and extent since the previous day, the storm area extending as far east as the thirtieth meridian. This was the beginning of a series of most disastrous storms that continued over the steamer lanes with very brief intermissions until the end of the month, and was responsible for a large number of marine disasters. On the 23d there was also a Low over Ireland, with westerly gales in the southerly quadrants.

On the 24th Belle Isle was near the center of another disturbance with westerly gales between the thirty-fifth and forty-fifth parallels, while conditions along the steamer lanes on this date and the 25th did not differ materially from those of the 23d.

On the 26th the storm area was restricted to the region between the thirty-fifth and fiftieth parallels, east of the fortieth meridian. On the 26th there was also a slight depression central a short distance north of the Bermudas that afterwards developed considerably as it moved northward. The center of this Low on the 27th was about 10° south of Halifax and on the 28th near Belle Isle. On both of these dates gales were encountered along the American coast between Hatteras and Halifax, while conditions over the greater part of the steamer lanes had moderated temporarily, although moderate westerly gales were encountered off the coast of Europe.

Charts IX to XI show the conditions for the period from the 29th to 31st, when unusually severe storms prevailed over the greater part of the steamer lanes, while, on the 29th, there was also a "norther" in the Gulf of Mexico.